

APR 03 2007

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
Guo-Xin Jin et al.

Serial No.: 10/692,900

Filed: October 24, 2003

For: Polymerized Catalyst
Composition

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Examiner: Helene Klemanski

Group Art Unit: 1755

Docket No: 2002B148B/2

Confirmation No.: 8713

Date: April 3, 2007

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION UNDER 37 C.F.R. §1.131

I, Zerong Lin, declare as follows:

1. I am one of the inventors of the subject application and one of the authors of the attached Exhibit A.

2. Exhibit A is a copy of a patent memorandum that I and others submitted to the ExxonMobil Chemical Company Patent Department as part of an invention disclosure that forms the basis of the present application. The patent memorandum indicates conception and reduction to practice of the claimed invention before June 5, 2002. All masked dates in Exhibit A are prior to June 5, 2002.

3. The subject matter of Exhibit A was diligently prepared and filed as U.S. Patent Application Serial No. 10/692,900 beginning at a time prior to June 5, 2002, until the filing of priority applications: USSN 60/421,282 filed October 25, 2002; USSN 60/421,163 filed October 25, 2002 and USSN 60/421,164 filed October 25, 2002.

4. Exhibit A shows that the invention, which forms the subject matter of the pending claims in the above-captioned patent application, was conceived in the United States, specifically

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in the State of Texas, before June 5, 2002, and diligently reduced to practice in the United States by at least October 25, 2002, the filing date of the U.S. priority provisional applications: 60/421,282; 60/421,163; and 60/421,164.

5. Exhibit A includes a description of pyridine diimine complexes, as recited in, for example, claim 1. More particularly, Exhibit A includes a description of bis-[1-(2,6-diisopropylphenylimino) ethyl]-6-[1-(4-allyl-2,6-diisopropyl phenylimino) ethyl] pyridine iron dichloride, as recited in claim 1. (*See, Exhibit A*, pages 1-2.)

6. Exhibit A is offered as supporting evidence that the compounds of the present invention were conceived in the United States before June 5, 2002, the earliest publication date amongst Jin et al. (CN Patent Application No. 1352204A) and Liu et al. ("Polymer-Incorporated Iron Catalysts for Ethylene Polymerization," which published on August 20, 2002), and diligently reduced to practice by filing the priority applications on October 25, 2002.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

April 3, 2007
Date

Zerong Lin
Zerong Lin, Ph. D.

EXHIBIT A

PATENT MEMORANDUM

EXXON CHEMICAL COMPANY

INVENTOR(S)

Robert J. Wittenbrink, Guo-Xin Jin, Zerong Lin, Chang-Kun Liu

DATE

EXACT DESCRIPTIVE TITLE

Polymerized Late Transition Metal Catalyst

PATENT COMMITTEE

BRIEF ABSTRACT OF INVENTION

STATUS OF INVENTION (EXISTING OR CONTEMPLATED EXPERIMENTAL, COMMERCIAL OR PLANT SCALE USE)

Experimental

DATE OF FIRST USE, PUBLICATION, AND/OR SALE

Copolymerization of Fe(II) or Co(II) pyridine diimine complexes containing olefinic substituents on aryl groups with styrene in the presence of a radical initiator results in polymerized late transition metal catalysts which can be used for olefin polymerization or oligomerization. These catalysts have high catalyst activity for olefin polymerization or oligomerization.

WERE YOU WORKING FULL OR PART TIME ON ANY GOVERNMENT CONTRACT AT, OR WITHIN ONE YEAR PRIOR TO THE TIME THE INVENTION WAS FIRST CONCEIVED OR TESTED?

FOR LAW-TECHNOLOGY DEPARTMENT USE ONLY

YES NO COINVENTOR NO(S)

DATE RECEIVED DATE

ATTORNEY'S INIT. BAC

FIRST WRITTEN DESCRIPTION

HEREWITH OR FILED AT

DATE OF FIRST TEST

WHERE RECORDED? (see instructions)

DATE

FIRST SKETCH OR DRAWING

HEREWITH OR FILED AT

COMPANY REPORTS, FILE MEMOS, PMS RELATED TO INVENTION (IDENTIFY)

DATE

FIRST DISCLOSURES TO OTHERS

TO WHOM AND WHERE

IS MODEL OR PROTOTYPE AVAILABLE?

YES NO

DATE

DETAILED DESCRIPTION OF INVENTION (SEE INSTRUCTIONS ON REVERSE SIDE)

The inventive polymerized late transition metal catalysts are prepared by copolymerizing Fe(II) or Co(II) pyridine diimine complexes containing polymerizable olefinic substituents on aryl groups with an olefin such as styrene in the presence of a radical initiator (e.g., AIBN). Divinyl benzene is optionally added for cross-linking.

With MAO as a co-catalyst, the polymerized late transition metal catalysts can be used for ethylene polymerization. The data in Table I demonstrate that polymerized Fe catalyst I has higher catalyst activity and produces PE with higher MW.

The inventive polymerized late transition metal catalysts can be used for olefin polymerization or oligomerization.

Preparation of Polymerized Late-Transition metal (Fe) catalyst (II)

A solution containing Bis-[1-(2,6-diisopropylphenylimino) ethyl]-6-[1-(4-allyl-2,6-diisopropyl phenylimino) ethyl] pyridine Iron Dichloride (I) (0.50g, 0.77 mmol), styrene (4ml) and AIBN (0.06g) in 50ml toluene was kept at 80°C for 7hrs. The resulting solution was evaporated and residue was washed with dried mixture solution of hexane and toluene (2:1). The solid polymer product was collected.

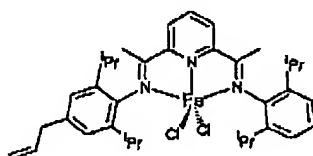
Ethylene polymerization using catalysts(II) in the presence of MMAO in the solution of toluene under the condition of 1 atmosphere of ethylene were investigated. The results of ethylene polymerization were summarized:

The Result of Ethylene Polymerization				
catalyst	T(°C)	n(Al):n(Fe) (molar ratio)	10 ⁴ Activity (g PE / mol Fe.h)	10 ⁴ M _n
II	13	550	1.033	15.74
		1100	2.145	15.32
		1650	2.233	11.12
		2200	2.446	6.29
		2750	2.315	7.33
		3300	1.912	6.25
	-15	2200	5.948	20.59
	0		4.500	20.11
	30		2.112	5.46
	45		1.314	4.92
	60		0.725	4.86

EXHIBIT A

Table 1. Polymerized Fe Catalyst I for Ethylene Polymerization

Catalyst	Activity, 10^6 g PE/(mol M \cdot atm \cdot hr)	MW
I	4.1	8.9×10^4
Polymerized I	6.2	1.3×10^5

**I**